

RESTRICTED

TM 5-267

SUPPLEMENT 2

WAR DEPARTMENT

TECHNICAL MANUAL

CAMOUFLAGE

July 1, 1943

CAMOUFLAGE



FIGURE 1.—Concealment for 75-mm pack howitzer, using materials found on site.

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FIGURE 2.—Tank and half-tracks, showing effect of colored pattern against background. Note that form is indistinct; details are difficult to identify.

Colored patterns used for toning down and patterning combat vehicles will be of real value only if they blend with natural backgrounds. Paint wrongly applied merely colors a target. Properly applied paint makes concealment easier.

COLORING VEHICLES

GENERAL CONSIDERATIONS.—In coloring vehicles we must remember that the enemy may view the vehicles in any one or a combination of ways—at close range on the ground, visually from the air, and in aerial photographs. The enemy wants to know how many vehicles there are in an area, and of what types.

THE OBJECTIVE.—To foil him, we must color vehicles in such a way as to make observation difficult. This makes it harder for the enemy gunner to locate the mass of the vehicles, and confuses him as to the position of their vulnerable places. Coloring alone cannot conceal a moving vehicle, because other sight factors such as dust, reflections, and the act of motion itself, will betray its presence. Coloring does not fulfill its purpose unless it matches the terrain the vehicle is to travel over.

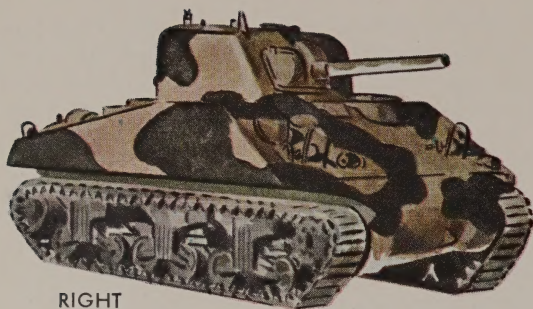
BACKGROUND.—Background is the factor which determines the color, or color combinations, to be used in coloring vehicles. The four general types of backgrounds are temperate, jungle, desert, and snow-covered regions. Within any of these types, and even in localities within a single region, there is usually a wide variation in backgrounds. It must be remembered that background seen from above is different from the same background

seen by an observer on the ground.

COUNTERSHADING.—Most animals are colored darkest on top and lightest underneath, with intermediate tones on the flanks. The dark top surfaces receive the most light and reflect the least. Under surfaces receive the least light and reflect the most. The result tends to produce an even tone over the entire body of the animal. The same principle should be applied in coloring vehicles.

DISRUPTION.—The eye is likely to recognize only familiar forms. To make the familiar forms of vehicles less conspicuous, painted patterns are used to break up the forms. If carried over vulnerable points in the armor of vehicles, these patterns make it difficult for the enemy to sight accurately. Patterns should be large and bold in proportion to the size and shape of the vehicle to be treated.

COLORATION.—In general, the colors used in blending should be similar to the color and tone of the surrounding country. They should be black or dark-toned in areas containing rough texture, light sandy-buff in arid desert surroundings, and white in snow-covered regions. Black is always present in terrain in the form of shadow. The amount of black used should correspond to the approximate amount of shadow in the terrain.

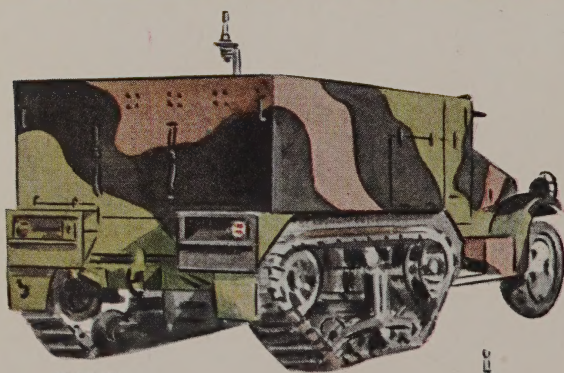


RIGHT

FIGURE 3. ① and ②.—
Patterns should be bold in proportion to size and shape of the vehicle. Such patterns tend to reduce conspicuousness of vehicle forms while small patterns have opposite effect.

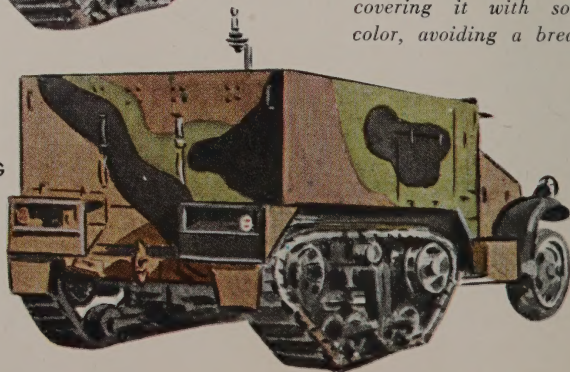


WRONG

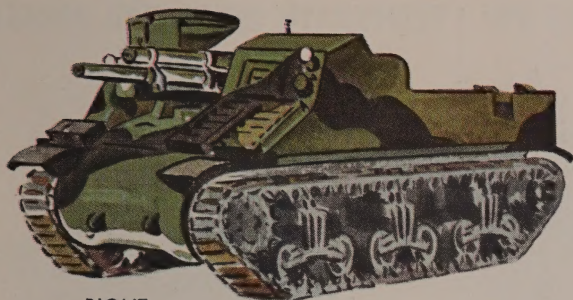


RIGHT

FIGURE 4. ① and ②.—
Color patterns break up form more readily when carried around corners. They make a vulnerable point less conspicuous by covering it with solid color, avoiding a break.



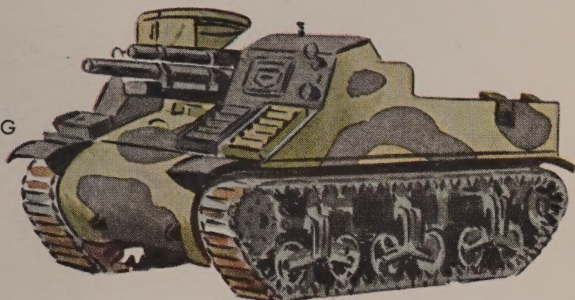
WRONG



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FIGURE 5. ① and ②.—
The most effective manner of using color combinations is to employ strong contrasts. Mass of vehicle and locations of vulnerable points in armor are harder to distinguish.

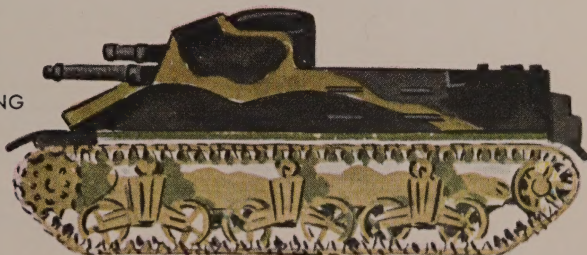
WRONG



RIGHT

FIGURE 6. ① and ②.—
As a rule, black should be used sparingly in vehicle coloring, since backgrounds are seldom black or dark-toned except in areas which contain rough texture.

WRONG



SUGGESTED PATTERNS FOR TEMPERATE ZONES AND JUNGLE

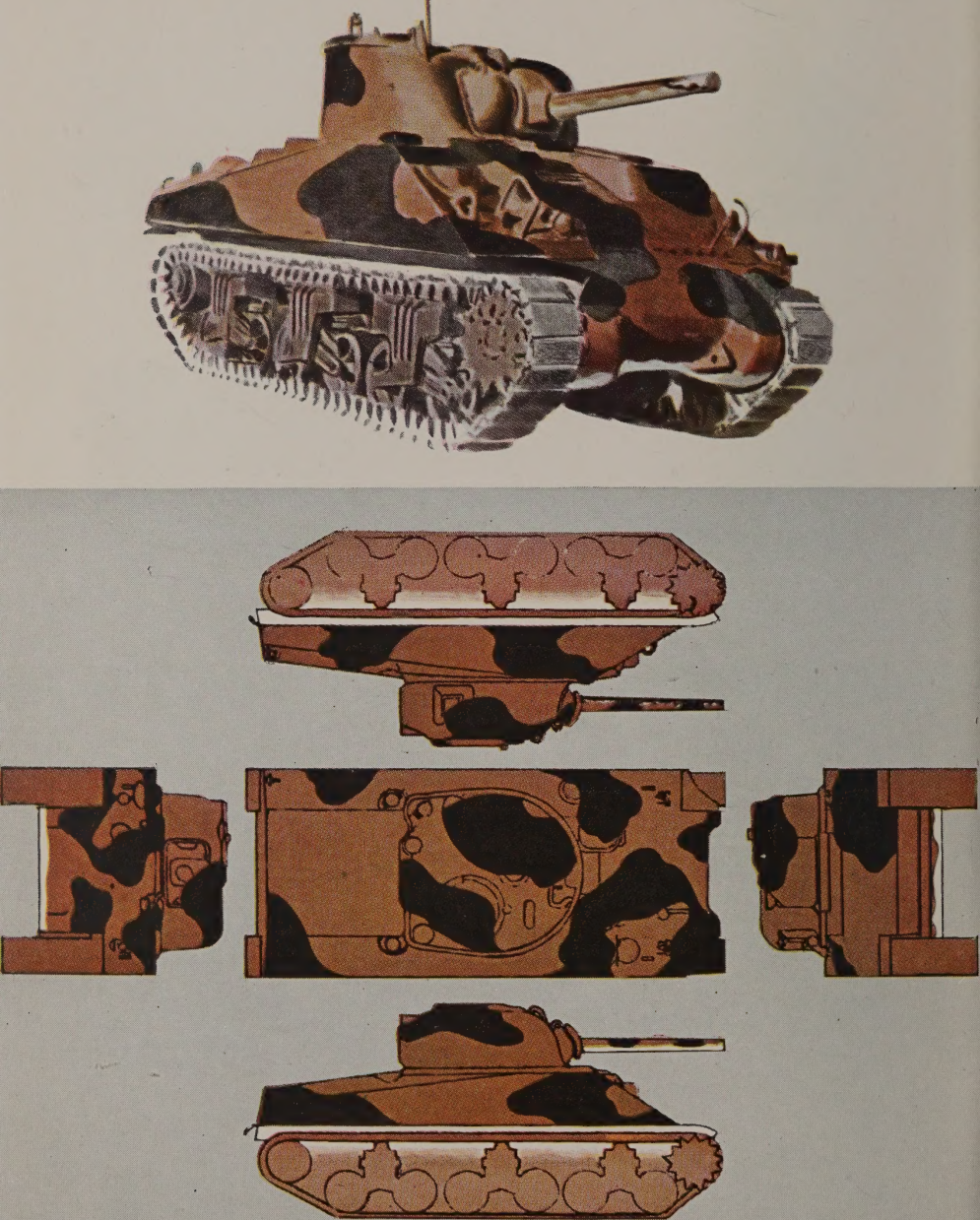


FIGURE 7. ① and ②.—View and pattern of a medium tank painted in three colors. Two or three colors are sufficient for usual camouflage in temperate zones and jungle.

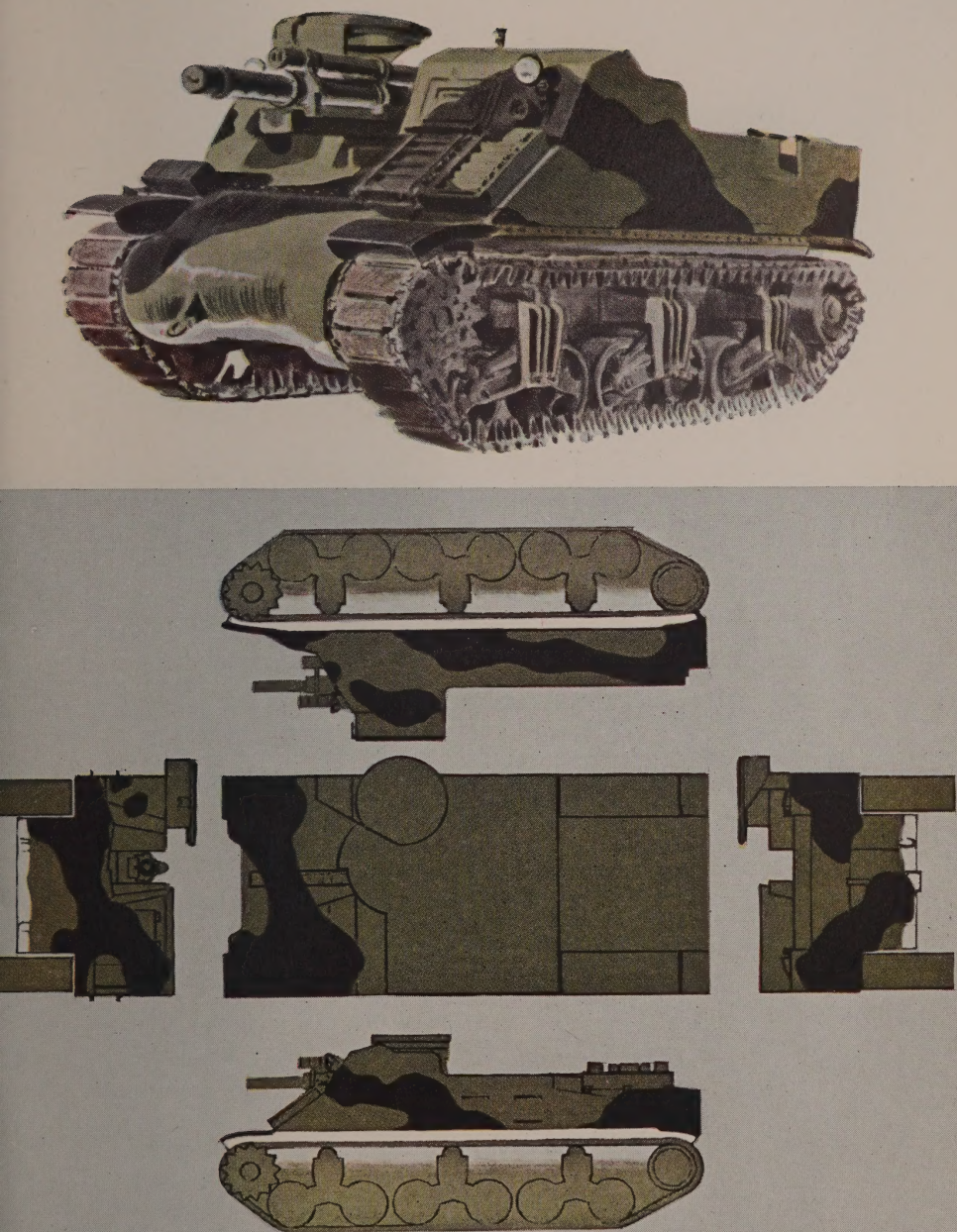


FIGURE 8. ① and ②.—A tank destroyer painted in three contrasting colors. Black is used to match shadows, white for undercarriage; the predominant terrain color is also used.

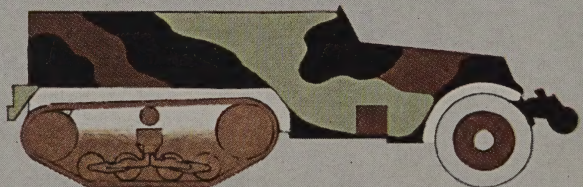
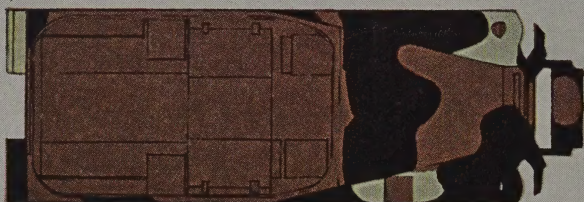
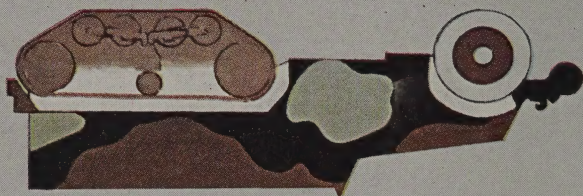
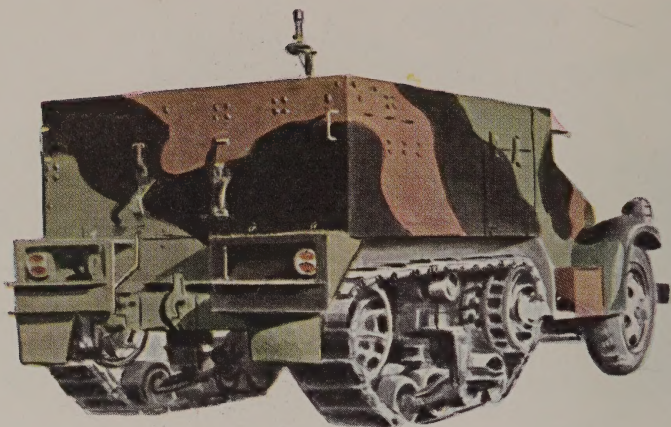


FIGURE 9. ① and ②.—Four colors have been used on this half-track—olive drab, field drab, and black on hood and body, with white countershading. When vehicle has top, the pattern should continue over the whole area.

SUGGESTED PATTERN FOR SNOW TERRAIN

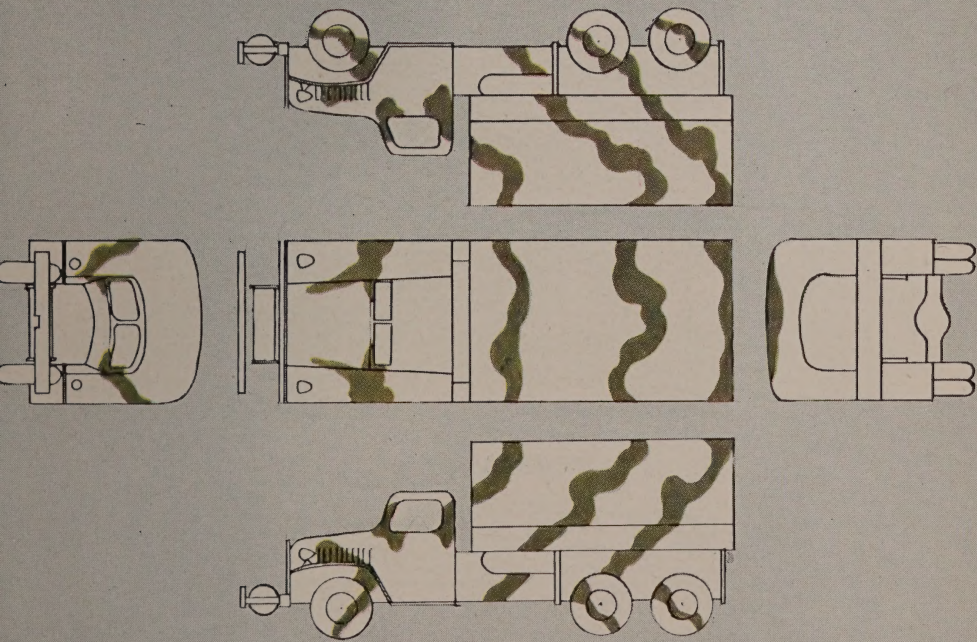
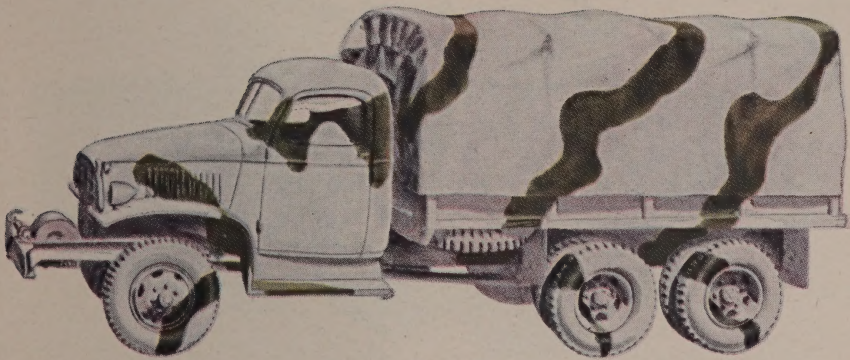


FIGURE 10. ① and ②.—A pattern which blends a 2½-ton truck into a background of snow and trees. Note that the two-color pattern is extended over the wheels.

SUGGESTED PATTERNS FOR DESERT TERRAIN

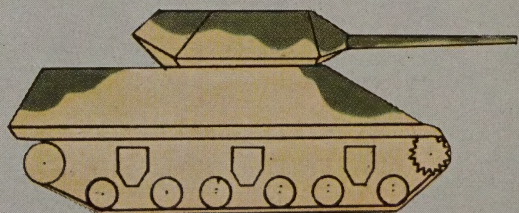
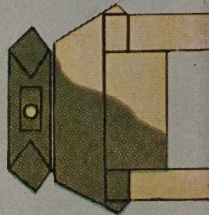
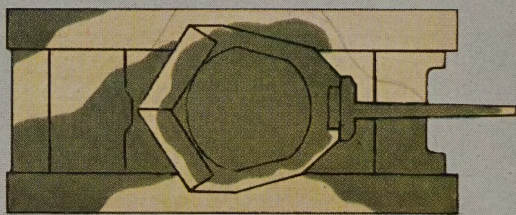
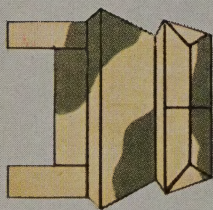
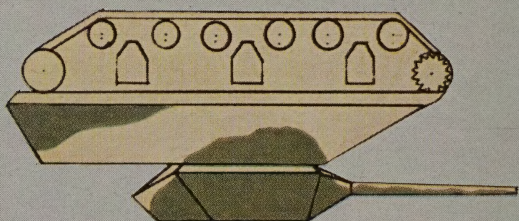
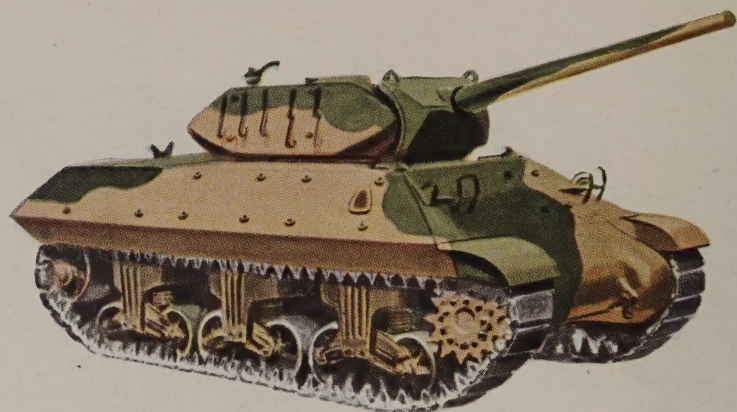


FIGURE 11. ① and ②.—A large, two-color pattern suitable for use on an M-10 gun carriage operating against light desert backgrounds is shown here.

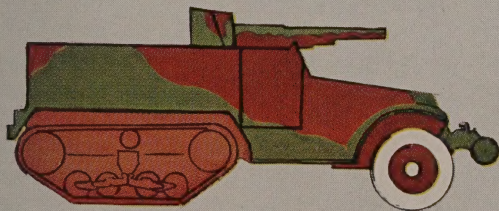
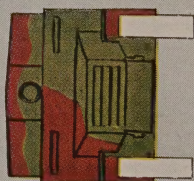
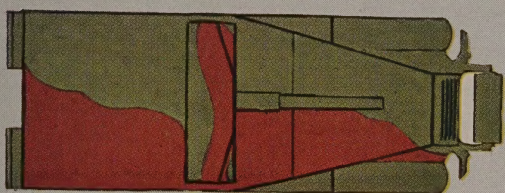
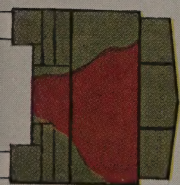
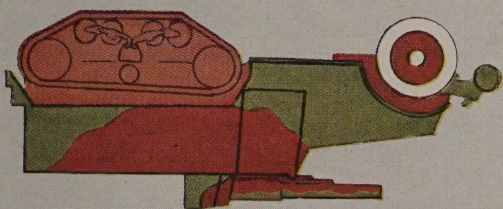
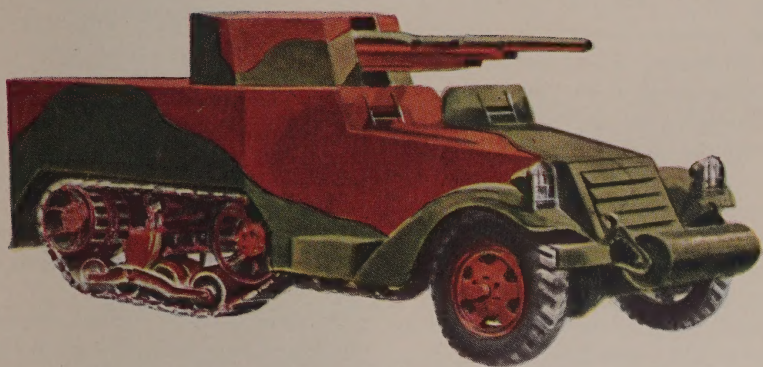


FIGURE 12. ① and ②.—Against a reddish desert background, this 75-mm gun on motor carriage will appear relatively inconspicuous in its two-color pattern.

METHODS AND MATERIALS

The field expedient of *coloring vehicles with mud, or with grease mixed in sand*, is of utmost importance in combat zones, where the success of a mission may depend upon remaining hidden, and where a quickly prepared and easily applied substance must be found. In training areas expedients are not often used.

Mud is applied by mixing it in a bucket and then daubing or pouring it over the vehicle surfaces. The soil materials selected should be typical of the locality in which the vehicle is operating, and when dry should match the prevailing surface tones of the area. Colors can be changed quickly as localities (backgrounds) vary in the course of operations. Camouflaging of vehicles with mud should be done during field training to make the practice habitual with troops. However, this does not constitute an excuse for military slovenliness when camouflage is not applicable.

PAINTING is a more permanent method of coloring vehicles. For best results, use *oleoresinous paint, emulsifiable*, (Corps of Engineers, Tentative Specification No. T-1279) with one part paste to one part water or gasoline or mineral spirits, if available, by volume; or *ready-mixed oil-type paint* (Corps of Engineers, Tentative Specification No. T-1215).

For temporary purposes the following paints are satisfactory, except that in freezing weather the second alone is usable:

(1) *Coldwater protein-binder paint* (Corps of Engineers, Tentative Specification No. T-1093B) is used with two parts of paste to one part of water by volume or 6 to 8 pounds of powder to 1 gallon of water. Some

surfaces require a thicker mixture.

(2) *Gasoline soluble paint* (Corps of Engineers, Tentative Specification No. T-1227) is mixed with one part gasoline to one part powder by volume. Gasoline will remove it.

(3) *Bituminous emulsion paint* (Corps of Engineers, Tentative Specification No. T-1224) is mixed with two parts of paste to one part of water by volume.

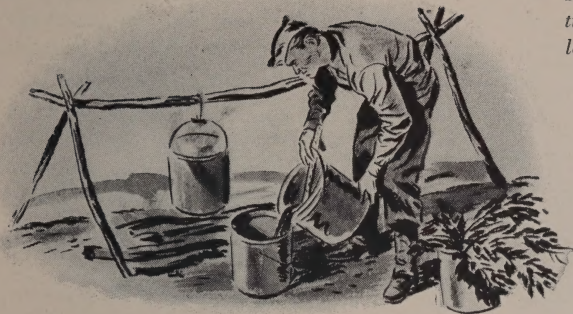
These paints can all be brushed on clean surfaces without a priming coat.

In snow-covered regions, the fabric or tarpaulin portion of a truck should be painted with coldwater paint (whitewash, calcimine, or alabastine). Five pounds of powder are used to each $\frac{2}{3}$ of a gallon of water. It is applied with a brush. The metallic surfaces should be painted with either casein or oleoresinous paint, also applied with a brush. In cold weather, oleoresinous paint ($1\frac{1}{2}$ parts of paint to one part of gasoline by volume) works best on metallic surfaces. Approximately 6 man-hours are required to paint a $2\frac{1}{2}$ -ton truck, brushing the paint on. The exact whiteness of snow is difficult to paint.

In desert zones, patterns should extend around corners and edges. Make the pattern large enough to be apparent at the range desired. Usually, not more than three colors will be necessary. Combination patterns of the standard camouflage colors, earth-yellow, earth-red, sand, olive-drab, and black, are usually satisfactory.

"Whenever requirements for camouflage and concealment outweigh the requirements for recognition, the national symbol may be covered by lusterless olive-drab gasoline-solvent paint, camouflage nets, oil and dirt, etc., or will be removed." (AR 850-5, Sec. III, Par. 10.)

FIGURE 13.—Green vegetation being boiled in 5-gallon cans to make adhesive.



FIELD EXPEDIENTS

Local conditions frequently demand the use of substitute methods and materials to accomplish desired camouflage results. Here are a few suggested field expedients.

ANCHORING FLAT-TOPS.—Where flat-top anchor stakes and holdfasts are not practical because of rocky or unstable terrain, a **counter-balance** (fig. 14) is a possible sub-

stitute, except in the case of flat-tops with embrasures. This expedient is not recommended for artillery positions, and must be used judiciously elsewhere, since it will not stand se-



FIGURE 14.—Substitute for stakes and holdfasts in unstable or rocky terrain. Substitute itself must be camouflaged.

vere shocks, snow loads, or heavy winds. The counterbalance is suspended in a shallow pit with its top flush with the ground. Both should then be camouflaged with natural materials.

Use of deadmen.—Another method of holding anchor wires in un-

stable soil is to use *deadmen* (fig. 15). Anchor wires are fastened to the deadmen (large rocks, logs, flat metal or wood pieces). The latter are then buried 2 feet (slightly more in soft soil) beneath the surface of the ground. Use natural materials to conceal the resulting ground scar.

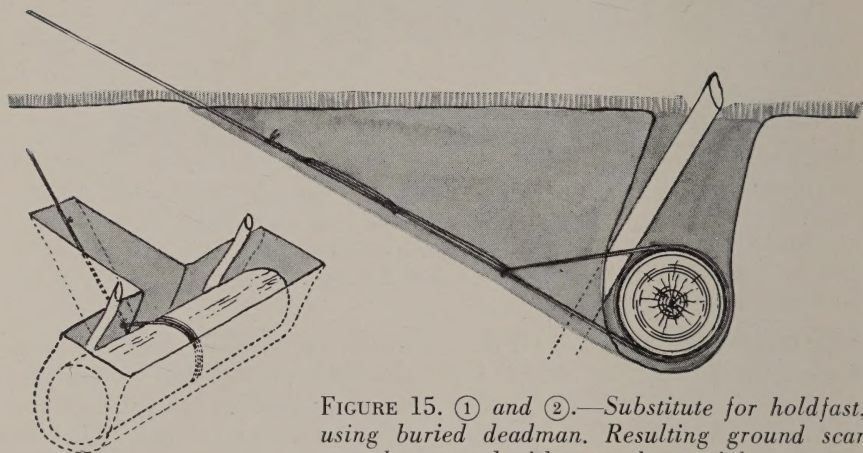


FIGURE 15. ① and ②.—*Substitute for holdfast, using buried deadman. Resulting ground scar must be covered with natural materials.*

COLORING TENTAGE.—Faded or undyed tentage can be darkened by staining it with charcoal and water. The charcoal is obtained by burning scrap lumber and crushing the residue as fine as possible. It is then mixed with water and swabbed on the canvas with a rag. Although rain washes off this stain to some extent, the original color of the tentage remains toned down for a considerable length of time.

GREEN - VEGETATION ADHESIVE.—A highly satisfactory dark-colored adhesive can be made from practically any green vegetation, such as leaves, shrubs, vines, weeds,

crop plants, and most desert plants. The only equipment needed is one or more 5- or 10-gallon metal buckets, depending on how much adhesive is wanted, and a GI can or 55-gallon drum.

After removal of the largest stalks and branches, the plant materials are packed firmly into the buckets until the latter are approximately two-thirds full. Sufficient water is then added to cover the plant material by about 2 inches. The mixture is boiled over a fire for half an hour. The liquid, which contains most of the adhesive substances, is then poured off into the GI can or 55-gallon drum to be boiled down to a thicker con-

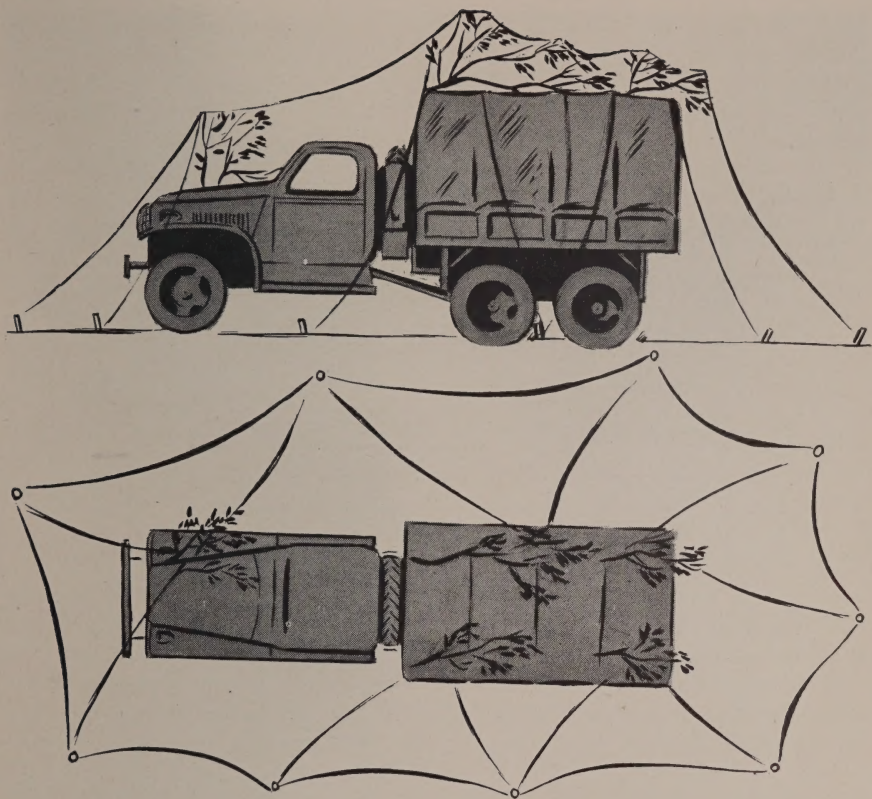


FIGURE 16. ① and ②.—Brush, cartons, or cases may be used to support vehicle drape when poles are unavailable. Be careful to avoid damaging your canvas.

sistency. To avoid boiling over, the container is never more than half filled. It is important to use only freshly-cut plant materials; otherwise the quality of the adhesive will be unsatisfactory.

For application of sand, soil, ashes, or woods litter to a surface (fig. 17), the adhesive should have about the consistency of molasses or emulsion paint, so that it can be spread on with a rag or improvised brush. The texturing material should be put on at once and a second application dusted on before the adhesive dries.

For application of leaves, grass, bark, twigs and other heavier materials, the adhesive should be boiled down to a paste so heavy that it will

not run after it is applied. It should be put on in small patches; the texturing material is pressed on each patch before the next one is applied.

One gallon of medium-consistency adhesive will cover about 1,000 square feet of smooth surface and from 400 to 500 square feet of rough surface. Twelve to fifteen 5-gallon bucketsful of vegetation yield about 1 gallon of medium-heavy syrup.

The green-vegetation type of adhesive can be used on any clean sur-



FIGURE 17.—*Vehicle camouflaged with leaves applied with green-vegetation adhesive.*

face and is especially effective for applying texture to vehicle bodies, since it can be scrubbed off quickly with water. Ordinary rains do not seriously affect its binding quality for short periods of time.

TRUCK-TARPAULIN SHELTER.

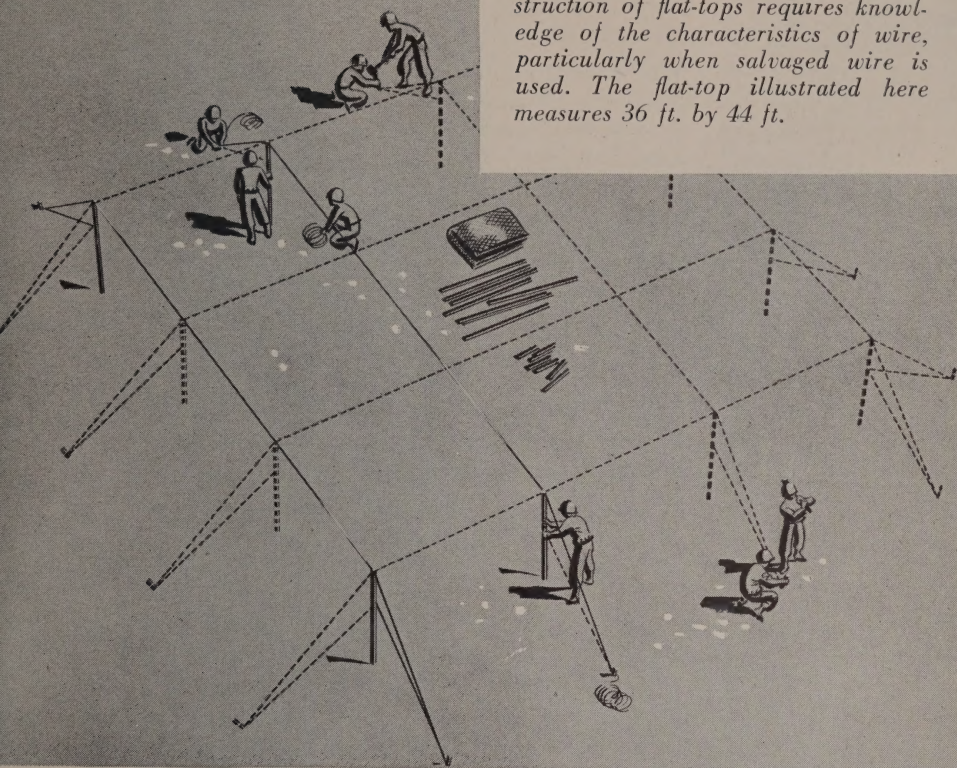
—A convenient camouflaged shelter

can be made out of a truck tarpaulin with bows by digging a pit and placing the bows over it with the ends buried 18 to 24 inches deep. The sides of the tarpaulin are pulled out and pegged, then covered with dirt and brush. Bushes and cut foliage are used to conceal the dark end openings of the shelter.



FIGURE 18.—*Concealment for pit furnished by truck tarpaulin and bows garnished with natural materials. Openings are concealed.*

FIGURE 19. — *Rapid, reliable construction of flat-tops requires knowledge of the characteristics of wire, particularly when salvaged wire is used. The flat-top illustrated here measures 36 ft. by 44 ft.*



THE tensile strength of No. 10 and No. 16 smooth-strand wire has been found to vary considerably in different rolls. There are similar differences of strength in different types of splices. Detailed tests were recently conducted to provide definite data on strengths for troops using these wires in camouflage construction.

Following are the results of tests given wire samples obtained from 20 different rolls:

Tensile strength	No. 10 Wire	No. 16 Wire
High	1,790 lb.	300 lb.
Low	650 lb.	200 lb.
Average	1,050 lb.	250 lb.

It was found during the tests that the hardness of wire roughly indi-

FACTS ABOUT SMOOTH-STRAND WIRE

cated its strength. Wire from one particularly soft roll broke as easily as copper wire, indicating that an occasional bad roll may be received from depots.

The tests disclosed that the tensile strength of No. 10 wire is greatly impaired by kinks that cannot be straightened by hand. A small cut or nick, and sometimes even a deep

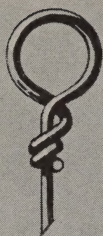


FIGURE 20.—Telegraph wrap with pliers, 2 full turns:

Wire broke at 1,050 lb.

This splice elongated about $\frac{1}{8}$ in. at 1,000 lb. and standing end broke inside wrap at 1,230 lb.



FIGURE 21.—Telegraph wrap with pliers, 4 full turns:

Wire broke at 1,230 lb.

This splice elongated about $\frac{1}{8}$ in. at 1,000 lb. and standing end broke inside wrap at 1,230 lb.

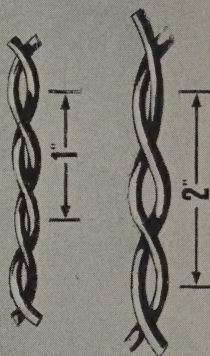
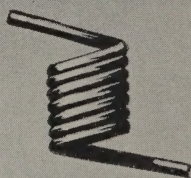


FIGURE 22.—Telegraph wrap with pliers, 6 full turns:

Wire broke at 1,230 lb.

Elongation and breakage same as for 4 full turns.



scratch may affect its strength.

The splices tested are shown in the illustrations. Strengths before breaking or unwinding of different types of splices are based on an average of not less than three tests each. Aver-

age No. 10 wire was used in all cases.

The conclusions were:

1. Wire should not be twisted too much in racking if its maximum strength is to be retained. Tightly racked wire is unsuitable for salvage.

FIGURE 23.—Square knot, tied by hand:

Wire broke at 1,230 lb.

This splice elongated from 4 to 8 in. before it tightened and held 1,000 lb. Break occurred adjacent to knot at 1,230 lb.



FIGURE 26.—Long wrap by hand, 1½ full turns.

Splice unwound at 740 lb.

Wire did not break.

FIGURE 24.—Racked Wire:

	<i>1 full turn per 2 in.</i>
1 strand before racking	1,230 lb.
2 strands racked	2,200 lb.
1 strand after untwisting	970 lb.

	<i>1 full turn per in.</i>
1 strand before racking	1,230 lb.
2 strands racked	2,000 lb.
1 strand after untwisting	650 lb.



FIGURE 27.—Long wrap by hand, 2 full turns:

Splice unwound at 810 lb.

Wire did not break.

FIGURE 25.—Wire wound 8 full turns around 60d nail:

Before winding, 1,230 lb.

After straightening by hand, 830 lb.



FIGURE 28.—Long wrap by hand, 3½ full turns:

Splice unwound at 890 lb.

Wire did not break.

2. In salvaging wire, pieces having kinks or loops that cannot be straightened by hand should be discarded or cut and spliced at those points.

3. The splice using the telegraph wrap with pliers should be used

where maximum strength is required.

4. The square knot is valuable when salvaging wire if three or four men in the salvage team are used to pull the knot tight. Come-alongs can be used satisfactorily for this purpose.



Signs of military activity often give the enemy valuable clues to the existence of an installation. The type of unit in an area may be determined by telltale traces of activity alone. If the enemy has photographed the terrain, any change will arouse suspicion. We discuss here what these signs of activity are, how they may be avoided or neutralized, how a training program may be set up.

CAMOUFLAGE DISCIPLINE



Tracks

Spoil

Debris

Maintenance

TRACKS and new paths are the most common signs of activity, especially when they do not conform to the existing track pattern of the terrain. For example, in rural areas existing tracks usually follow the field boundaries. Tracks cutting across fields are likely to be suspected at once.

The area around the end of a path or track will be carefully studied. The enemy wants to know *why* the track ends. Similarly, he is interested in any road or path which shows signs of heavy travel for only part of its length.

Avoiding or neutralizing tracks.—

Since military operations depend upon movement, tracks are unavoidable. They should follow existing

tracks or terrain features, such as ditches, hedges, or lines of rocks or trees. Tracks which cannot be concealed in this manner should continue past the installation (fig. 30) to a decoy position or to an existing road or path. New tracks which are not often used can be concealed by resodding or by brushing over when made in sand or leaves. It is usually impossible, however, to brush up broken long grass and weeds, or to conceal tracks in the snow. Necessary tracks are planned; all others are avoided.

When existing paths are followed, the control of turn-offs to prevent widening and corner-cutting is necessary. This control can be obtained by posting guides (fig. 31). Often, particularly under muddy conditions, it is advisable to wire in existing tracks and paths (fig. 32) to avert widening and resulting changes in the appearance of the path. No. 10 smooth-strand wire is attached firmly to stakes set about hand-high on both sides of the road or path. Tracing tape, which is more easily seen by vehicle drivers, may also be used.

II

SPOIL or dirt from excavations is another noticeable sign of activity. Its difference of color and texture

FIGURE 29. — *A complete lack of camouflage discipline produced the telltale signs which clearly point out this bivouac to the enemy air observer.*

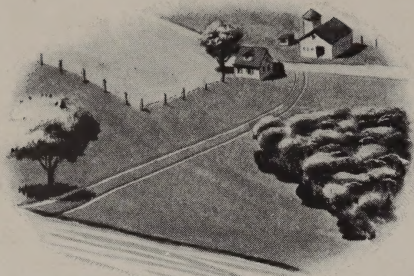


FIGURE 30.—Continue tracks past a position to an existing road or decoy, if concealed approach is possible.

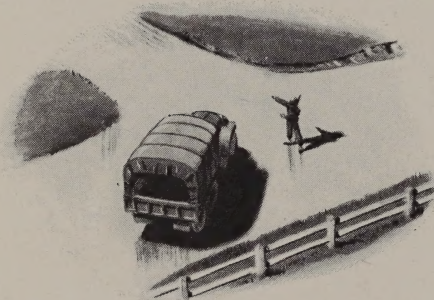


FIGURE 31.—Post guides to prevent truck drivers from cutting corners.



FIGURE 32.—Wire in existing roads to prevent widening, especially at mud-holes.

makes it stand out against undisturbed surroundings. Since spoil frequently indicates the presence of field fortifications, it is sure to attract enemy attention. The size, shape, arrangement, and number of piles of spoil indicate the type and mission of a unit almost as completely as a personal visit to the installation.

What to do with spoil. — Small quantities of spoil can often be concealed under bushes, around the bases of trees (fig. 33), along roads, and in streams. Where no trees are nearby or where there is too much spoil for easy concealment, it can be sodded over (fig. 34). The sod is carefully removed from the site of the excavation and from the area where the spoil is to be placed. After the excavation has been completed, the sod is replaced over the well-packed spoil. It must be borne in mind that sod will wilt and change color, since it is usually impossible to water it under combat conditions.

Usually the sod that has been saved will not be sufficient to cover all the spoil. Additional sod must then be gathered from the terrain. Small pieces, 8 to 10 inches in diameter, can be gathered and used with the sod that has been saved. Care should be taken to avoid making obvious earth scars by taking too much from one place. Sodding the bottom of excavations is another method of disguising them.

Since there is always the possibility of enemy observation before excavation can be completed, the fresh spoil should be covered with natural or artificial camouflage material until it can be resodded. Earth scars which cannot be resodded can be toned down with bituminous emulsion, waste crankcase oil, or similar materials; or it can be covered with

leaves in fall or winter, or with grass.

III

DEBRIS almost always accumulates during military occupation of an area. Clothing is being dried and bedding aired; tin cans, shell cases, and other waste materials pile up. If not properly disposed of or concealed, debris reveals a position to an enemy plane (fig. 35).

The disposal of debris. — Continued training is about the only cure for leaving bedding, clothes, and equipment in the open, or for letting debris accumulate. Constant inspection and prompt discipline of offenders are required if carelessness of this sort is to be avoided.

IV

MAINTENANCE of camouflage structures such as drapes and flat-tops, which are always larger than the objects they conceal, is another vital part of camouflage discipline. If they are permitted to sag, fade, or otherwise change their original appearance, they may easily be more conspicuous than the unconcealed installation would have been. In the same way, natural materials must be renewed when they wither or change color.

Maintenance techniques. — Camouflage training in the erection of drapes and flat-tops and in the use of natural materials should include instruction in proper maintenance.

Natural foliage must be replaced before it withers (fig. 36), which in summer may mean daily or more often. As a rule, large branches keep fresh longer than small ones, and certain varieties of trees resist withering better than others. Do not take vegetation from a covered position for use in the open. Use hardwood

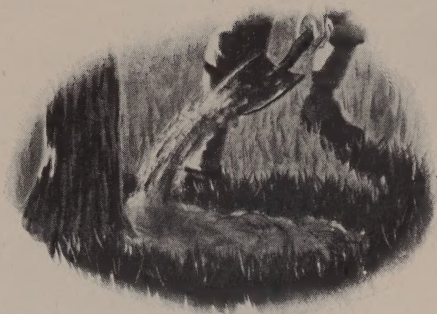


FIGURE 33.—Conceal spoil under adjacent bushes and trees whenever possible.



FIGURE 34.—If time permits, sod over new spoil where bushes and trees are not available.



FIGURE 35.—Shelter tents, laundry, and bedding visible from the air must be concealed.

branches wherever possible. Tough leaves usually last longer.

Withered foliage can sometimes be preserved by spraying with the proper color paint. Evergreens and branches of other trees will retain their green color for two weeks or more in summer if sprayed with green oleoresinous paint.

From the air, flat-top nets which sag between supporting wires (fig. 37) present a readily identifiable pattern. For that reason flat-tops must be kept tight. When twine nets are used, they must be slacked during rains and on nights when dew may form, since twine nets shrink as much as 10% when wet.

Seasonal changes in the colors of the terrain must be anticipated, and the colors of artificial camouflage materials must be changed accordingly, by regarnishing or repainting. Plans must be made well in advance, and must be flexible because the time of change is variable and may come suddenly.

One practical system has been employed at a permanent gun position using wire netting. Every man replaces each day one or more strips of the cloth garnishing with another strip of the next season's color. This changeover routine is started in advance of a seasonal color change.

Signs of activity are generally the results of essential routine actions. Camouflage discipline techniques are intended either to direct the performance of those actions in such a way as to prevent visible changes in the appearance of the terrain, or to make necessary changes misleading to the enemy observer or photograph interpreter.

V

TRAINING SUGGESTIONS.—The following suggestions are intended to

help commanders in developing camouflage procedures distinctive to their units.

Specific training. — The soundest introduction to camouflage discipline is the study of aerial photographs containing examples of good and bad discipline. For example, a short lecture, illustrated by rough sketches or large-scale photographs revealing signs of activity, describes the clues used by the enemy interpreter in identifying military installations. A photograph, preferably of familiar terrain, is then posted on the company bulletin board and is accompanied by a set of questions designed to cause the men to study the photograph and compare it with their knowledge of the terrain. (Note that it is not necessary to provide each man with a photograph for his own use.) A subsequent training period includes discussion of the questions. Practical suggestions are also given on layout and occupation of a completed bivouac, and on other operating problems, considered from the camouflage standpoint.

Specific training can be continued, without interfering with other elements of the training program, by posting other photographs and questions on a bulletin board. Answers to the questions are posted after a few days.

Inclusion in tactical training. — The next step in camouflage discipline is to include it in other tactical training programs. (In fact, all phases of concealment and camouflage, including choice of position and use of appropriate camouflage techniques, should be included). This will prevent the development of "parade ground" habits of doing things in formalized ways and of making the regular patterns which indicate a

military installation to the enemy.

Men should be taught to act as though they are continually subject to enemy observation. For example, vehicle drivers should acquire the habit of parking their vehicles under the best natural concealment and of covering all reflecting surfaces. Once these habits are formed, they will persist in actual theaters of operations where it is not possible to supervise each driver so closely.

SOP. — Efficient operation requires the assignment of missions and responsibilities and the delegation of the necessary authority to accomplish them. Camouflage is no exception. Camouflage standard operating procedure (SOP) provides a useful method of insuring that each individual in a unit knows his job and has the authority to carry it out. It is a function of the interior guard and the duty of all officers and NCO's to enforce camouflage provisions contained in their unit SOP.

Quartermaster party. — The quartermaster officer is responsible for planning the bivouac so as to obtain maximum use of natural concealment in the area assigned. In artillery units, the reconnaissance officer has this responsibility. This preliminary step is vitally necessary to avoid visible tracks, broken foliage, and similar signs which would betray the location of a unit even before it had become established.

As soon as the unit has moved in, personnel of the quartermaster party indicate restrictions on using paths, on the traffic-circulation plan, general locations of parking areas and latrines, and other matters affecting the camouflage and concealment of the organization as a whole.

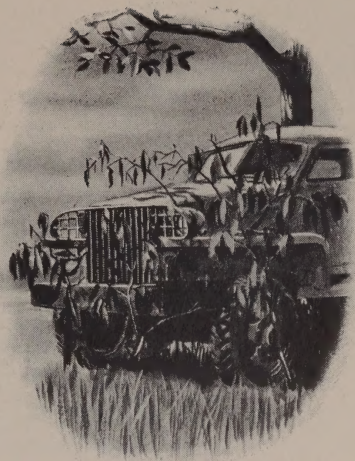


FIGURE 36. — *The lighter color of withered leaves reveals camouflage positions. Renew withered foliage promptly.*



FIGURE 37.—*Sagging flat-top nets are easily identified from the air. Keep nets tight at all times.*



FACES AND

FIGURE 38.—*Natural skin color plus familiar shadows around eyes, nose, mouth, and cheekbones make face easy to recognize even at a distance.*

SKIN COLOR contrasts strongly with most of the colors in nature. Thus when individuals otherwise well concealed are discovered, it is usually because their faces and hands have been identified. For this reason scouts, snipers, observers, and men in small-weapons emplacements should disguise faces and hands when they are to remain in positions close to the enemy for long periods. The same precautions should be taken by all troops during combat in dense

vegetation—such as jungles or forests—where the advantage is with those who make the best use of their wits.

Medical officers should warn troops, however, against staining their skins indiscriminately with dirt mixed with water or oil, or with colors extracted from unknown plants and trees. Their effect may be dangerous either because of irritating poisons or because they contain harmful bacteria. To avoid this danger, troops should be taught to recognize a few nonpoisonous plants and trees common to the region in which they are operating and which have the approval of the medical officer.



FIGURE 39.—*For a position among rocks or in open terrain, tone skin to a solid dark color. At night, use solid black.*



FIGURE 40.—*Shadow pattern of face can be broken up by splotches. Splotches should cut across nose, mouth, and cheeks.*

HANDS

Practical expedients are lampblack, obtainable from field lanterns, soot from field stoves or chimneys, soft charcoal obtained by burning wood, burnt cork, and crankcase drainings. Ordinary green grass, crushed between the palms of the hands and rubbed on the skin, stains it light green. Usually this stain lasts 8 to 10 hours.



FIGURE 41.—After splotch-treating his face and hands this sniper uses a few leaves and a net to eliminate shine from his helmet.



FIGURE 42.—Headnets for concealment of the face may be improvised from shrimp or mosquito netting, colored by dipping in strong coffee or in issue dye thinned with gasoline.



FIGURE 43.—No exposed skin should be overlooked; back of neck, chest, lower arms, and both backs and palms of hands should be painted.

NOTES FROM THEATERS OF

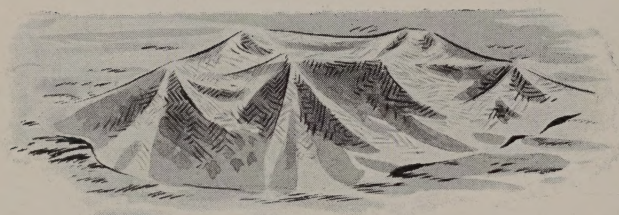


FIGURE 44. ① and ②.
—Camouflage nets are not “magic cloaks.” They must be garnished and used with props to break up shape of supplies they are concealing. Tone down light-colored boxes.

SOUTHWEST PACIFIC. — The Japs have utilized a method of marking partially concealed targets for high-altitude bombers. Photo reconnaissance is used to locate the target. With the photographs for guidance, a low-flying fighter pilot then finds the objective and drops flares or smoke bombs to mark the target for the high-flying bombers which follow. This type of operation is necessarily limited by the range of the fighter plane.

AFRICAN THEATER.—“ . . . Interest in camouflage among the men is markedly increased after a real bombing has been experienced, when

frequently it is too late. It therefore behooves unit commanders to profit from the lessons learned by other organizations, and to teach their commands to become ‘camouflage conscious’ prior to going into action . . .”

“ . . . An organization in a rear area parked its trucks with no thought of dispersal. During an enemy attack on an objective near the trucks, the bivouac was discovered and a bomber dropped a stick among the trucks. A large percentage of vehicles was lost.

“A large combat unit, well dispersed, had several hundred bombs dropped on it during daylight attacks, and lost only a few vehicles. . . .”

OPERATIONS



FIGURE 45.—Crews around a fieldpiece reveal its position even though all other elements are well concealed.

“ . . . Enemy interpreters of air photographs pay particular attention to tracks and roads which suddenly twist for no apparent reason of ground formation. They are likely to ascribe such twists to mine fields . . .

“Dummy tracks with these characteristics are a simple . . . way of misleading the enemy as to the true location of our mine fields, if the dummy fields are created in plausible localities.”

Here are some of the ways the enemy attempts to conceal the location of artillery during a siege.

1. Using several calibers on the same target at the same time and from different locations.

2. Using a flashless propellant.

3. Firing mortars and tank guns simultaneously with artillery.

4. Synchronizing false flashes and gun noise with artillery fire.

5. Conducting aerial bombing while shelling is taking place.

6. Changing positions frequently.

“ . . . In many cases the color of tents and vehicles does not fit the background. The terrain at the front varies considerably in color, and it is therefore sometimes necessary to apply mud or dust to tents or trucks to match the color of the ground. . . . It was noticed that light-colored

khaki tents had been placed against dark backgrounds when a light background was readily available. The opposite was true with the new dark OD tents. . . .”

“ . . . Trucks have been covered with mud so as to match the color of the terrain, and in open country, where no concealment is available, the truck parks are often more than 1,000 yards from the guns, with the vehicles well dispersed. . . .”

AGF OBSERVERS' REPORTS.—

Some of the units in theaters of operations have set up factories to manufacture garnished and ungarnished nets and portable dummies. This not only saves these units considerable time and labor, but also provides them with camouflage material which otherwise might not be available.

Camouflage nets are still being regarded — incorrectly — as “magic cloaks.” Drapes should not be laid directly on vehicles, but should be used with props to break up the shape. Ungarnished nets are used in rear areas in ineffective attempts to hide various items such as the bomb supply point in figure 44 ①.

In many cases where fieldpieces have been skillfully concealed, the crews have later disclosed the positions by relaxing around their guns with no thought of concealing themselves.

SIMPLE AIRCRAFT DECOYS

Every war produces new weapons and new defenses against those weapons. Reconnaissance planes, bombers, and other aircraft now enable armies to locate and destroy military targets on a scale and at a pace never before possible. It was soon discovered, however, that bombardiers and their bombs could be misled by false targets. Out of this grew the use of military decoys.

What is a decoy? — A decoy is bait. In war it can be anything from a mere sign of military activity to an imitation of a complete airdrome, so long as it is purposely arranged to attract enemy attention.

Decoys and dummies. — The words *decoy* and *dummy* have different meanings. A dummy is an imitation of a material object. While dummies are frequently essential in a decoy scheme, they have other uses, too. When a dummy house hides an anti-aircraft gun, it is there to keep the enemy from noticing the gun—the exact opposite of what it would be doing if it were in use as a decoy. Dummy planes, however, which are usually built or excavated in place, can be used only as decoys.

What can a decoy do? — A decoy can draw fire away from a genuine installation. It can dilute enemy fire by offering more targets than are actually occupied. It can deceive the enemy with respect to the strength and disposition of our offense or defense. By confusing and delaying the enemy, it can reduce the effectiveness of his fire.

How should decoys be used? — Decoys supplement concealment of the parent target. The better hidden the

parent target, the more persuasive the decoy.

A decoy must be plausible. It should excite the enemy's interest. When decoys are detected, it is usually because of neglect in providing signs of activity relating to them.

How should decoys be located? — A decoy airdrome should be located near enough to the real airdrome to draw attention but not so near that fire directed at the decoys will damage true targets. The exact distance depends on the size of the position, its nearness to landmarks, and the type of enemy fire that probably will be used against it.

OPERATING RULES

1. Hide all real planes based at the field.

2. To make dummies become decoys, half-conceal them as though your job of camouflage were inadequate.

3. Establish around decoys the operating scars, such as plane and vehicle tracks, normal to an airfield. Without such signs, decoys may contrast conspicuously with planes in actual operating positions.

4. Keep both decoys and their camouflage in good repair. After exposure to wind, rain, and snow, decoys will need tightening, mending, and perhaps repainting. Signs of activity will also need regular attention. For example, over a period of time, tracks should be progressively widened and short cuts made to appear as though roads were in use.

5. Move decoy planes regularly so as to simulate standard operating procedure.

6. Vary from day to day number of decoys revealed.

7. Large scale use of decoys must be coordinated by higher commands.



FIGURE 46. — **Turfless Silhouette with Painted Shadow.** *Because such decoys cannot be moved, their usefulness is limited. Shadows must be on side where shadows are normally cast in that latitude.*

FIGURE 47. — **Cloth Silhouette on Ground.** *Prepared in advance, cut-outs can be installed and moved quickly. They are effective as decoys from same altitudes as silhouette type shown in fig. 50.*

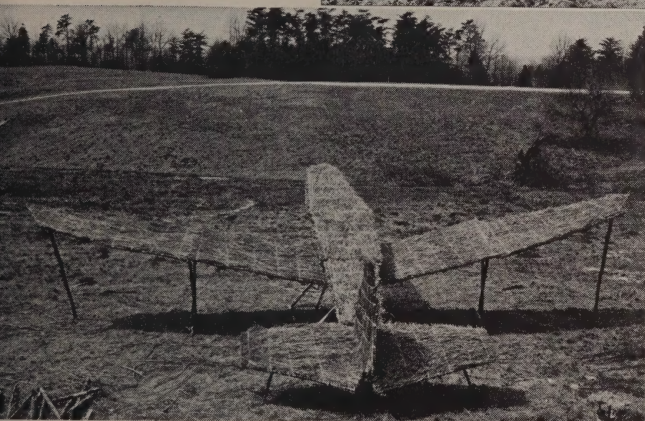
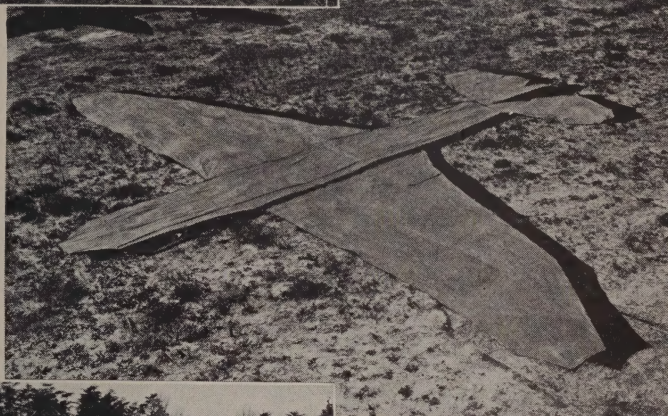
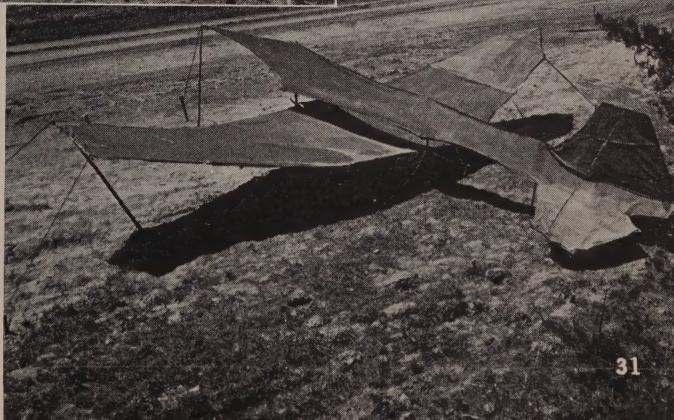


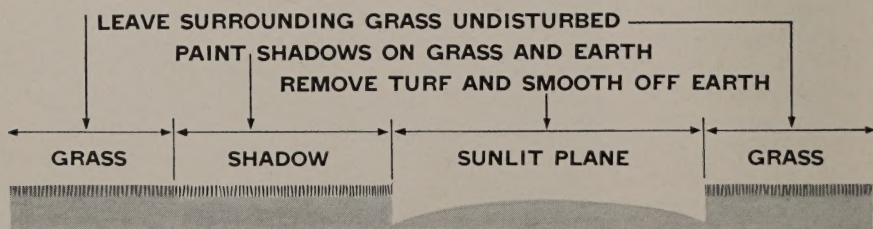
FIGURE 48. — **Decoy P-40, Sapling and Straw.** *The advantage of a sapling and straw decoy over the silhouette and cut-out types is that it casts natural shadows. Its design makes construction easy with a variety of field expedients.*

FIGURE 49. — **Decoy on Sapling and Wire Frame.** *This decoy will deceive enemy observers as low as 1,000 ft. To change its position, sets of supporting and guy stakes can be left in place at several sites.*



TURFLESS SILHOUETTE WITH PAINTED SHADOW

FIGURE 50.—Simplest possible aircraft decoy, difficult to detect by direct observation from 3,000 ft. to 5,000 ft. Decoy in insert was photographed from 1,000 ft. To assist in laying out decoys, mark off ground area to scale.



20
19
18
17
16
15
14
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2
1

Effectiveness of decoys depends on depth of shadow. To strengthen shadows, pile brush and debris evenly within the shadow outline, then stain brush and debris. Medium bomber, below, and P-38 at right.

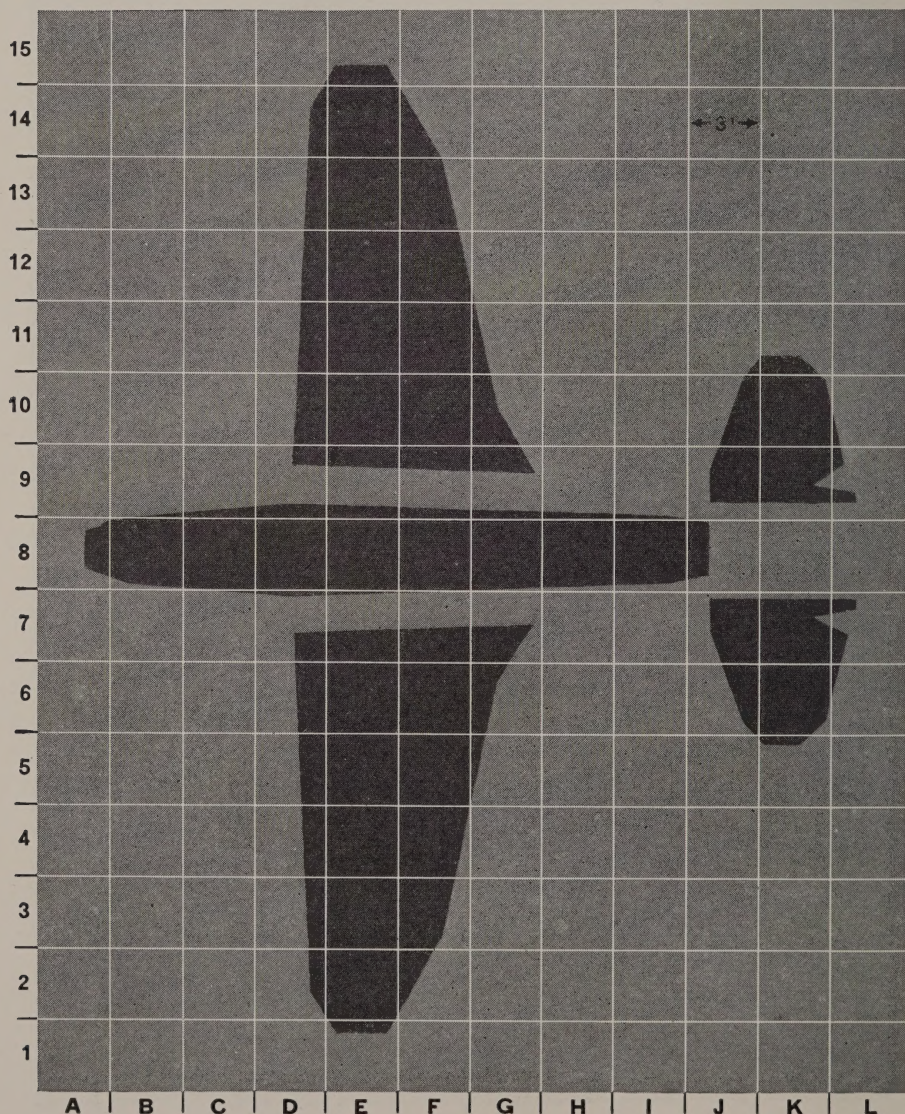
← 6' →

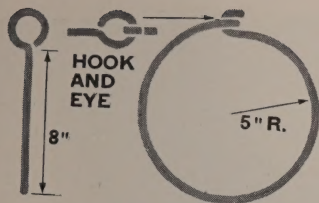
A B C D E F G H I J K L

P-40 CLOTH SILHOUETTE ON GROUND



FIGURE 51.—There are two working parts in this decoy—a black shadow cut-out and a plane cut-out. To determine roughly the outline of shadows for a particular time of day, trace outline of cut-out on the ground with a stick held vertically. Length of stick should approximate average height of upper parts of plane (5 ft.). End of stick's shadow indicates edge of plane's shadow.





Anchor pin. (100
needed, of No. 10
wire.)

Carrying ring of
No. 10 wire for
100 pins.

BILL OF MATERIALS

100 yd. of burlap or osnaburg
40 in. wide.

100 ft. No. 10 galvanized-iron
wire.

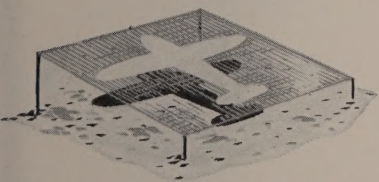
Black paint.

Olive-drab paint.

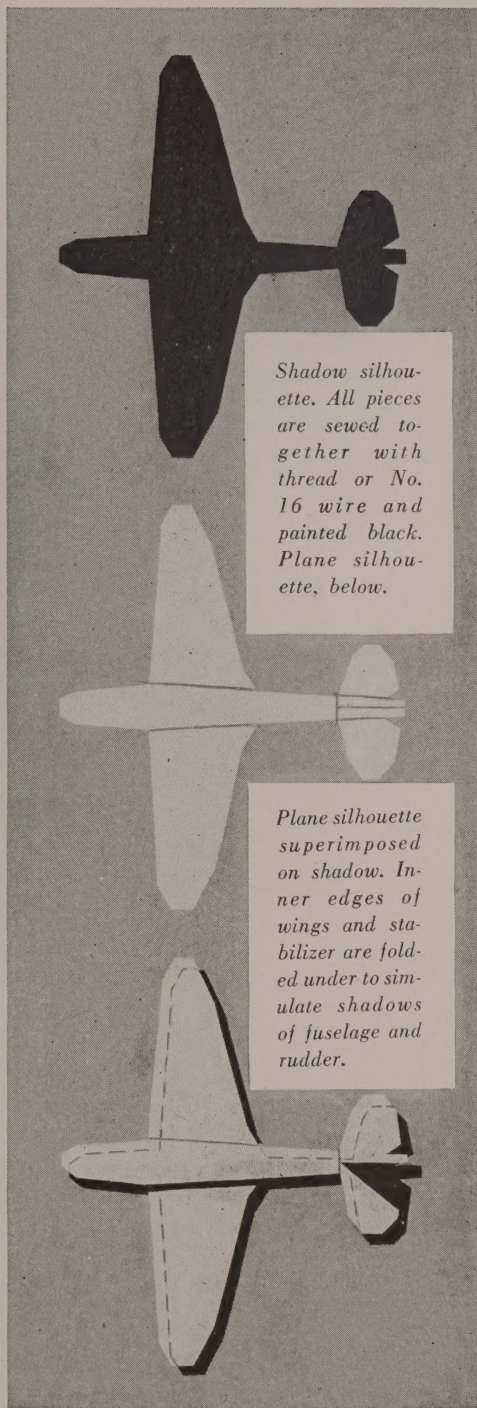
Thread or No. 16 wire.

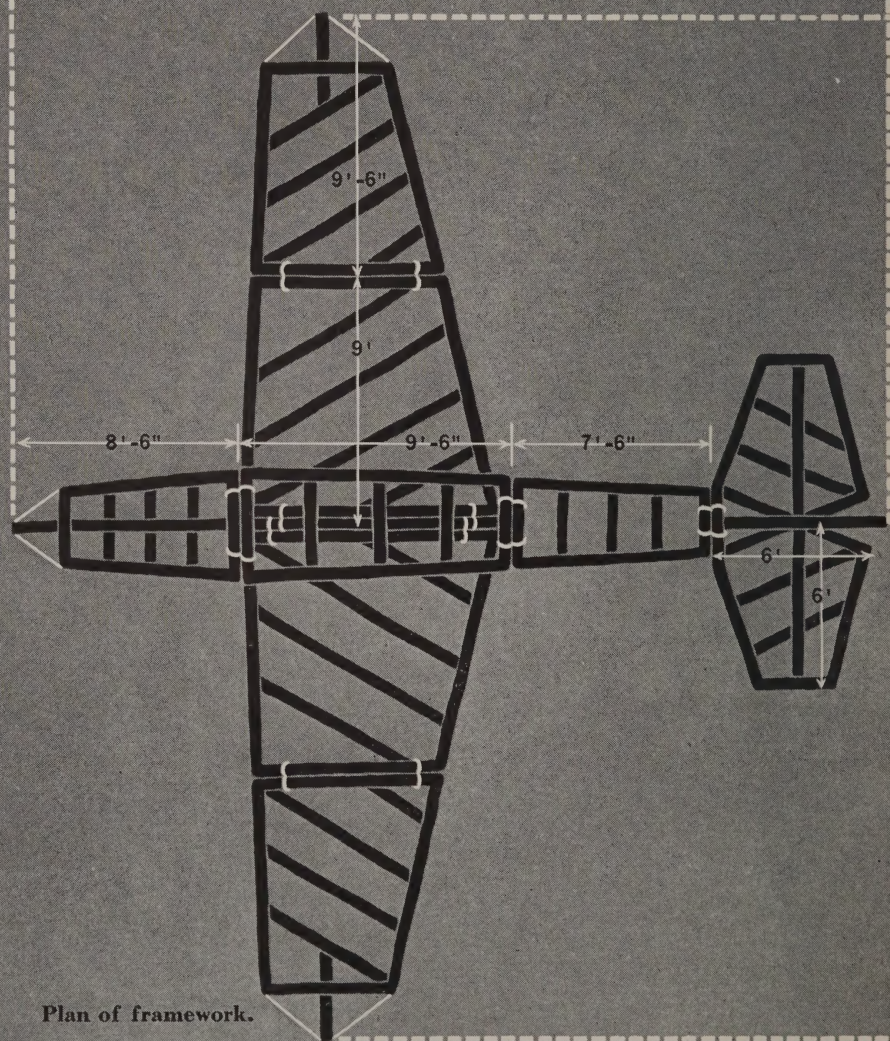
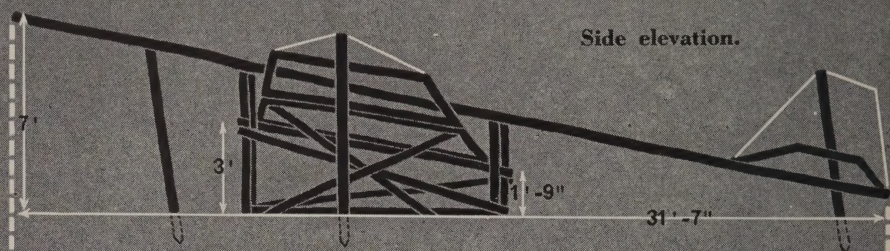
PROCEDURE

Cut cloth and sew strips of cloth together with thread or No. 16 wire to form two sets of parts shown in cutting diagram for plane silhouette. Sew together parts for shadow silhouette and leave parts separated for plane silhouette. In cutting allow 2 in. for hems and overlaps. Paint shadow black, and plane in accordance with local practices. Superimpose plane on shadow silhouette so exposed shadow conforms to length and direction of shadow cast by $2\frac{1}{2}$ ft. post. To make interior shadows, fold edge of plane silhouette under so as to expose shadow silhouette. Anchor silhouette with pins approximately 3 ft. on center.



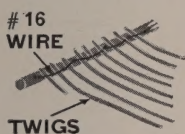
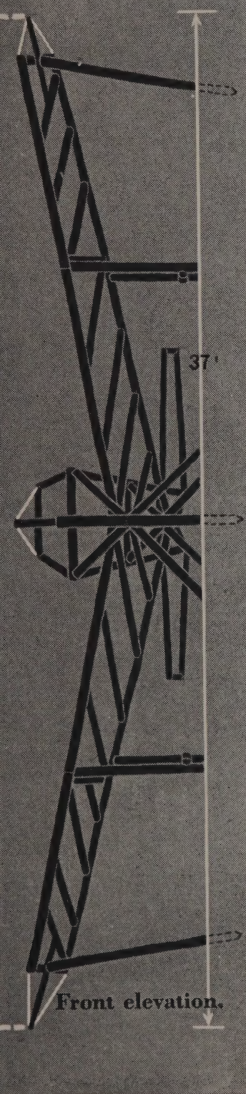
Note: Cut-outs can also be wired
or stitched to under side of a
lightly garnished, sloping net.



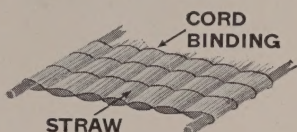


P-40 SAPLING AND STRAW

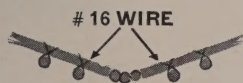
FIGURE 52.—Decoys elevated from ground but not imitating rounded form of planes will cast accurate shadows which move realistically with sun. To move decoy to different locations, unloosen wing guys, fold wings across fuselage, and tow on skids attached to supports under fuselage. Although shown here as covered with straw, this type can be improvised with burlap, cardboard, woven-paper net, heavy kraft-paper waterproofed with varnish, or fine wire netting. For completed construction see fig. 50. Dummy planes should be painted the color of the planes simulated.



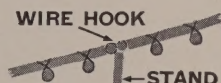
Stout twigs fastened to frame.



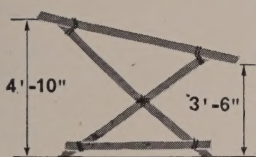
Straw tied to twig frame.



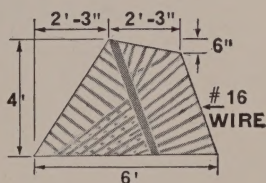
Section of wings at fuselage stand.



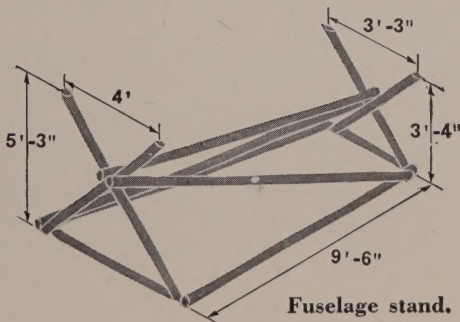
Section of wing at joint.



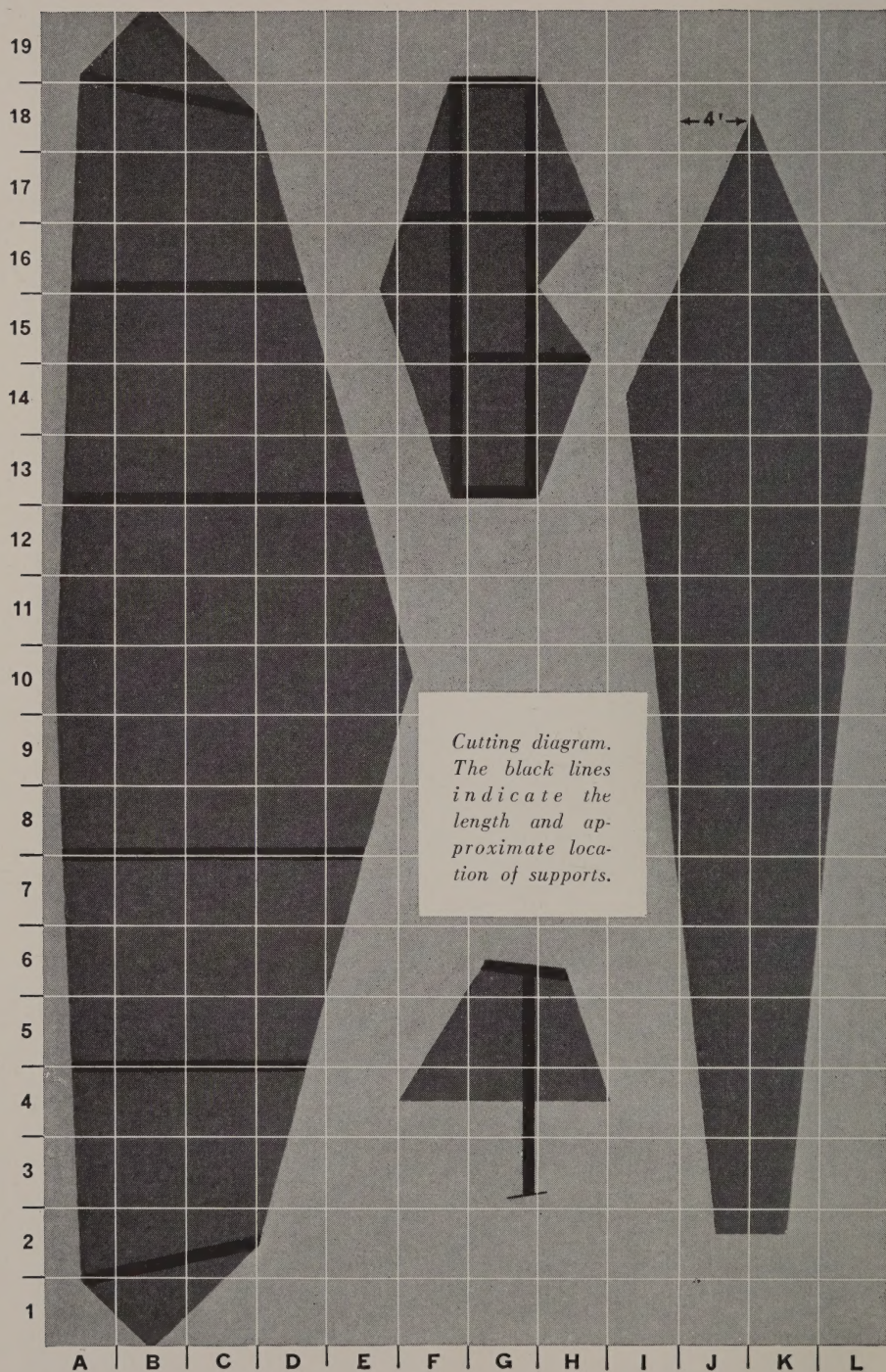
Wing stand.
(2 needed.)



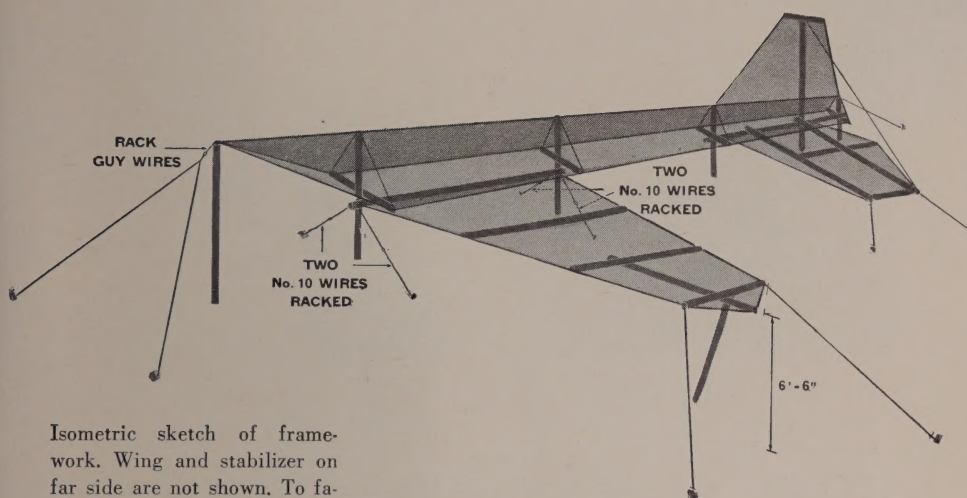
Detail of rudder.



Fuselage stand.



DECOY ON SAPLING AND WIRE FRAME

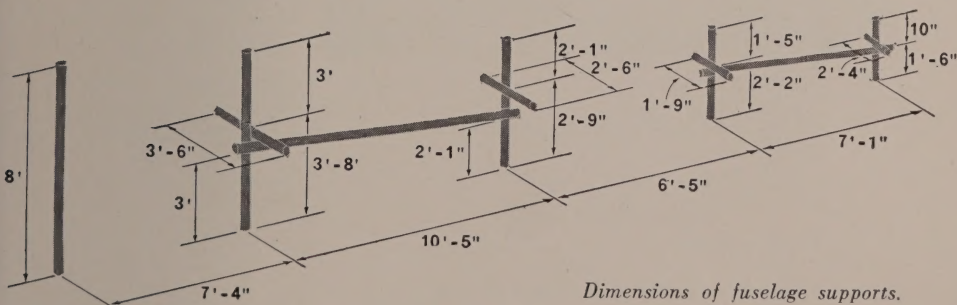


Isometric sketch of frame-work. Wing and stabilizer on far side are not shown. To facilitate moving the dummy, attach racked guys to frame separately from wires which support cloth. Single lines indicate No. 10 wire. Supports are securely wired at crossings with No. 10 or No. 16 wire.

BILL OF MATERIALS

65 yd. of burlap or osnaburg
40 in. wide.
450 ft. of No. 10 wire.
No. 16 wire as necessary.
Sapling or bamboo poles as
necessary — approximately
170 ft.
15 stakes.

FIGURE 53.—*This method of field construction raises decoy sufficiently above ground to provide the illusion of a real plane and its shadow. Using the same construction principles, details can be varied to resemble different pursuit planes. On the other hand, decoy bombers because of their size must bear closer resemblance to the original. Hence their construction usually is practicable only in rear areas where sufficient time and materials are available.*



Dimensions of fuselage supports.

USE OF PARTS AND WRECKS AS DECOYS

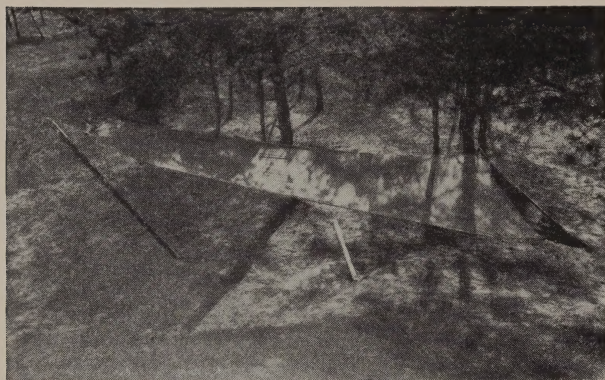


FIGURE 54. — *Dummy wing tips, or tail assemblies and similar parts of wrecked planes, arranged to protrude from under foliage, nets, or other concealment, will often arouse enemy interest.*

FIGURE 55. — *Real planes which have been shot down or wrecked beyond repair, but which can be patched up, make invaluable decoys capable of withstanding close enemy observation.*

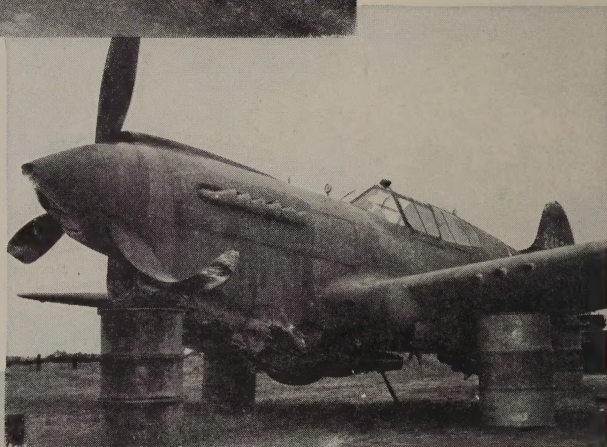


FIGURE 56. — *One of their own wrecked planes used as a decoy by the Japanese in New Guinea. Effectiveness would have been increased if plane had been only partly revealed by foliage.*

[A.G. 062.11 (3-5-43).]

By ORDER OF THE SECRETARY OF WAR:

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Major General,

The Adjutant General.

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(For explanation of symbol see FM 21-6).

G. C. MARSHALL,
Chief of Staff.

